FCC Test Report

FCC ID	:	TVE-2417T112
Equipment	:	Secured Wireless Access Point
Brand Name	:	FORTINET
Model Name	:	FAP-221E+, FAP-223E+ FortiAP 221Exxxxxx, FORTIAP-221Exxxxxx, FAP-221Exxxxxx, FAP-221E+xxxxxx, FortiAP 223Exxxxxx, FORTIAP-223Exxxxxx, FAP-223Exxxxxx, FAP-223E+xxxxxx (where "x" can be used as "A-Z", or "0-9", or "-", or blank for software changes or marketing purposes only)
Applicant / Manufacturer	:	Fortinet, Inc. 899 Kifer Road, Sunnyvale, CA 94086, USA
Standard	:	47 CFR FCC Part 15.247

The product was received on Apr. 26, 2018, and testing was started from May 03, 2018 and completed on May 15, 2018. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.10-2013 and shown compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Allen Lin

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issued Date
FR841009AL	01	Initial issue of report	Jun. 27, 2018

Summary of Test Result

Report Clause	Ref. Std. Clause	Test Items	Result (PASS/FAIL)	Remark
1.1.3	15.203	Antenna Requirement	PASS	FCC 15.203
3.1	15.207	AC Power-line Conducted Emissions	PASS	FCC 15.207
3.2	15.247(a)	DTS Bandwidth	PASS	≥500kHz
3.3	15.247(b)	Maximum Conducted Output Power	PASS	Power [dBm]:30
3.4	15.247(e)	Power Spectral Density	PASS	PSD [dBm/3kHz]:8
3.5	15.247(d)	Emissions in Non-restricted Frequency Bands	PASS	Non-Restricted Bands: >30 dBc
3.6	15.247(d)	Emissions in Restricted Frequency Bands	PASS	Restricted Bands: FCC 15.209

Reviewed by: Jeremy Lin

Report Producer: Ivy Yuan

1 General Description

1.1 Information

1.1.1 RF General Information

Frequency Range (MHz)	Bluetooth Mode	Ch. Frequency (MHz)	Channel Number
2400-2483.5	LE	2402-2480	0-39 [40]

Band	Mode	BWch (MHz)	Nant
2.4-2.4835GHz	BT-LE(1Mbps)	1.0	1TX

Note:
- Bluetooth LE uses a GFSK (1Mbps) modulation for DSSS.
- BWch is the nominal channel bandwidth.

1.1.2 Table for Multiple Listing

The brand/model names in the following table are all refer to the identical product.

Brand Name	Model Name	Difference	
		Internal antenna	External antenna
Fortinet	FAP-221E+	V	
Fortinet	FAP-223E+		V
Note 1:The only difference between FAP-221E+ and FAP-223E+ is the layout of the antenna.			

1.1.3 Antenna Information

FAP-221E+

Ant.	Port	Brand	Model Name	Antenna Type	Connector
1	1	InPaq	WA-M-LA-01-036	PIFA Antenna	I-PEX
2	2	InPaq	WA-M-LA-06-002	PIFA Antenna	I-PEX
3	1	InPaq	WA-M-LC-05-002	PIFA Antenna	I-PEX
4	2	InPaq	WA-M-LC-02-008	PIFA Antenna	I-PEX
5	1	INPAQ	ACA-5036-A2-CC-S	Chip	I-PEX

Ant.	Gain (dBi)		
	2.4G	BT	5G
1	3.89	-	-
2	3.89	-	-
3	-	-	5.55
4	-	-	5.55
5	-	2.93	-

FAP-223E+

Ant.	Port	Brand	Model Name	Antenna Type	Connector
1	1	WHA YU	C107-511533-A	Dipole Antenna	I-PEX
2	2	WHA YU	C107-511533-A	Dipole Antenna	I-PEX
3	1	WHA YU	C107-511533-A	Dipole Antenna	I-PEX
4	2	WHA YU	C107-511533-A	Dipole Antenna	I-PEX
5	1	INPAQ	ACA-5036-A2-CC-S	Chip	I-PEX

Ant.	Gain (dBi)		
	2.4G	BT	5G
1	2.0	-	-
2	2.0	-	-
3	-	-	3.0
4	-	-	3.0
5	-	2.93	-

For 2.4GHz function:

For IEEE 802.11 b/g mode (1TX/1RX)

Support diversity function and pre-tested Ant. 1(port 1) and Ant. 2(port 2) on each single chain, the worst case was Ant. 2(port 2) and it was record in this test report.

For IEEE 802.11 b/g/n mode (2TX/2RX)
Ant. 1 (port 1) and Ant. 2 (port 2) could transmit/receive simultaneously.
For BT function:
For IEEE 802.15.1 Bluetooth mode (1TX/1RX)
Ant. 1 (port 1) could transmit/receive simultaneously.
For 5GHz function:
For IEEE 802.11 a mode (1TX/1RX)
Support diversity function and pre-tested Ant. 1(port 1) and Ant. 2(port 2) on each single chain, the worst case was Ant. 2(port 2) and it was record in this test report.
For IEEE 802.11 a/n/ac mode (2TX/2RX)
Ant. 1 (port 1) and Ant. 2 (port 2) could transmit/receive simultaneously.

1.1.4 EUT Information

Operational Condition				
EUT Power Type	From AC Adapter / PoE			
EUT Function	☒	Point-to-multipoint	☐	Point-to-point
Type of EUT				
☒	Stand-alone			
☐	Combined (EUT where the radio part is fully integrated within another device)			
	Combined Equipment - Brand Name / Model No.:	…		
☐	Plug-in radio (EUT intended for a variety of host systems)			
	Host System - Brand Name / Model No.:	…		
☐	Other:			

1.1.5 Mode Test Duty Cycle

Mode	DC	DCF(dB)	T(s)	VBW(Hz) ≥ 1/T
BT-LE(1Mbps)	1	0	n/a (DC>=0.98)	n/a (DC>=0.98)

1.2 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- 47 CFR FCC Part 15
- ANSI C63.10-2013
- KDB 558074 D01 v04

1.3 Testing Location Information

Testing Location			
☒	HWA YA	ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)	
		TEL : 886-3-327-3456	FAX : 886-3-327-0973
Test site Designation No. TW1190 with FCC.			
☐	JHUBEI	ADD : No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County, Taiwan (R.O.C.)	
		TEL : 886-3-656-9065	FAX : 886-3-656-9085
Test site Designation No. TW0006 with FCC.			

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
RF Conducted	TH06-HY	Barry	21.5°C / 65%	04/May/2018
Radiated	03CH03-HY	Terry	22.7°C / 59%	04/May/2018
AC Conduction	CO04-HY	Daniel	22.8°C / 51%	15/May/2018

1.4 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2)

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	3.6 dB	Confidence levels of 95%
Radiated Emission (9kHz ~ 30MHz)	3.0 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	4.3 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.9 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Conducted Emission	1.3 dB	Confidence levels of 95%
Temperature	0.7 °C	Confidence levels of 95%
Humidity	4 %	Confidence levels of 95%

2 Test Configuration of EUT

2.1 Test Condition

RF Conducted	Abbreviation	Remark
TnomVnom	Tnom	20°C
-	Vnom	120V

2.2 Test Channel Mode

Test Software	Putty

Mode	PowerSetting
BT-LE(1Mbps)	-
2402MHz	4
2440MHz	4
2480MHz	4

2.3 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	AC power-line conducted emissions
Condition	AC power-line conducted measurement for line and neutral
Operating Mode	CTX
1	Adapter mode ; BT TX
FAP-221E+ configuration was pretested and found to be the worst case and measured during the test.	

The Worst Case Mode for Following Conformance Tests	
Tests Item	DTS Bandwidth Maximum Conducted Output Power Power Spectral Density Emissions in Non-restricted Frequency Bands
Test Condition	Conducted measurement at transmit chains

The Worst Case Mode for Following Conformance Tests			
Tests Item	Emissions in Restricted Frequency Bands		
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.		
Operating Mode < 1GHz	CTX		
1	Adapter mode		
Operating Mode > 1GHz	CTX		
Orthogonal Planes of EUT	**X Plane**	**Y Plane**	**Z Plane**
			
Worst Planes of EUT			V
FAP-221E+ configuration was pretested and found to be the worst case and measured during the test.			

The Worst Case Mode for Following Conformance Tests	
Tests Item	Simultaneous Transmission Analysis
Operating Mode	Bluetooth + WLAN 2.4GHz + WLAN 5GHz
Refer to Sporton Test Report No.: FA841009 for Co-location RF Exposure Evaluation.	

2.4 Support Equipment

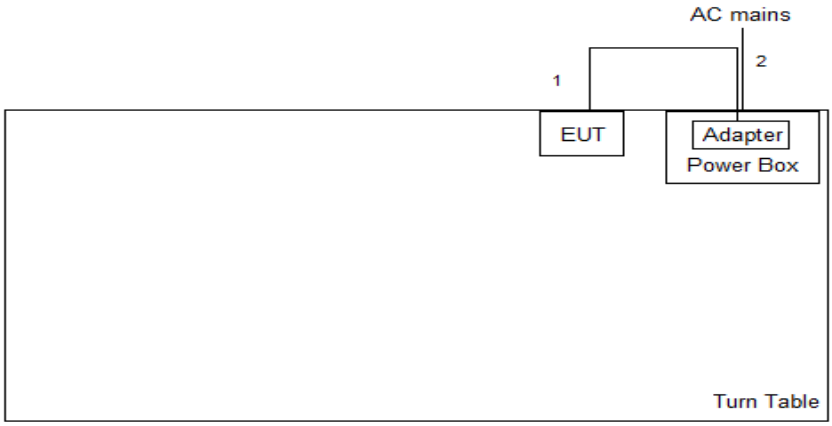
Support Equipment – RF Conducted				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Notebook	DELL	E5410	DoC
2	Adapter for NB	DELL	HA65NM130	DoC
3	AC Source	GW	APS-9102	-

Support Equipment – Radiated Emission				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Adapter	Asian Power Devices Inc.	WA-30J12R	-

Support Equipment – AC Conduction				
No.	**Equipment**	**Brand Name**	**Model Name**	**FCC ID**
1	Adapter	Asian Power Devices Inc.	WA-30J12R	-

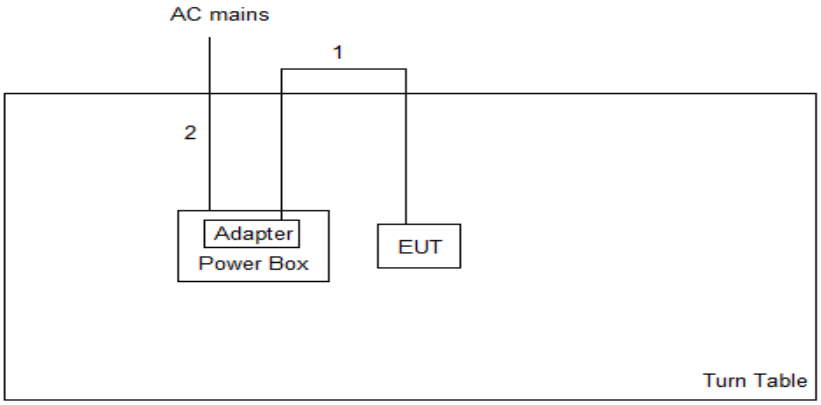
2.5 Test Setup Diagram

Test Setup Diagram – AC Line Conducted Emission Test



Item	Connection	Shielded	Length(m)	Remark
1	DC Power line	No	1.5	-
2	AC Power line	No	1.5	-

Test Setup Diagram - Radiated Test < 1GHz



Item	Connection	Shielded	Length(m)	Remark
1	DC Power line	No	1.5	-
2	AC Power line	No	1.5	-

3 Transmitter Test Result

3.1 AC Power-line Conducted Emissions

3.1.1 AC Power-line Conducted Emissions Limit

AC Power-line Conducted Emissions Limit		
Frequency Emission (MHz)	**Quasi-Peak**	**Average**
0.15-0.5	66 - 56 *	56 - 46 *
0.5-5	56	46
5-30	60	50
Note 1: * Decreases with the logarithm of the frequency.		

3.1.2 Measuring Instruments

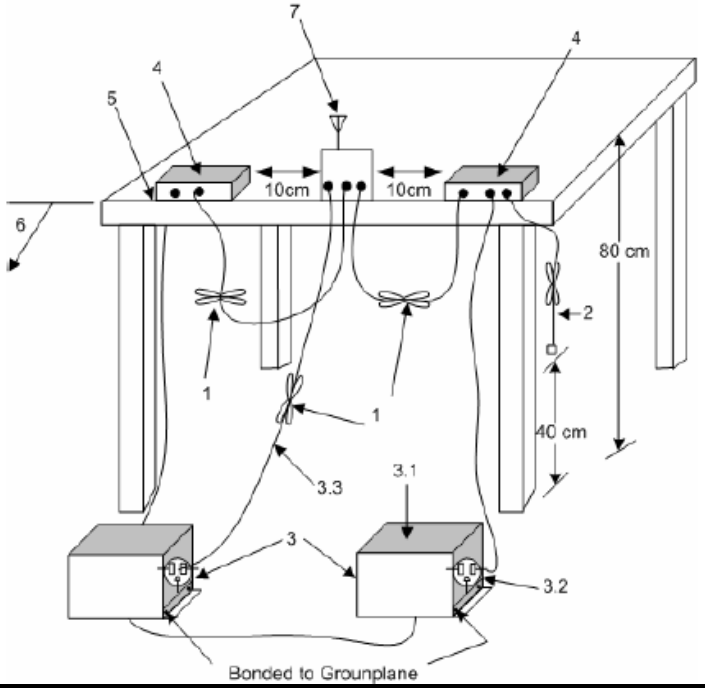
Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

Test Method
▪ Refer as ANSI C63.10-2013, clause 6.2 foray power-line conducted emissions.

3.1.4 Test Setup

AC Power-line Conducted Emissions



3.1.5 Test Result of AC Power-line Conducted Emissions

Refer as Appendix A

3.2 DTS Bandwidth

3.2.1 6dB Bandwidth Limit

6dB Bandwidth Limit
Systems using digital modulation techniques:
▪ 6 dB bandwidth ≥ 500 kHz.

3.2.2 Measuring Instruments

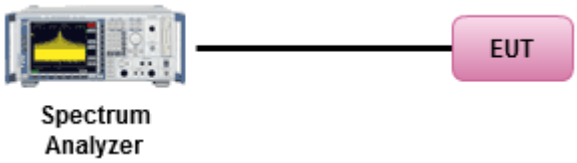
Refer a test equipment and calibration data table in this test report.

3.2.3 Test Procedures

Test Method	
▪ For the emission bandwidth shall be measured using one of the options below:	
	☒ Refer as KDB 558074, clause 8.1 Option 1 for 6 dB bandwidth measurement.
	☐ Refer as KDB 558074, clause 8.2 Option 2 for 6 dB bandwidth measurement.
	☐ Refer as RSS-Gen, clause 6.7 for for occupied bandwidth testing.
	☐ Refer as ANSI C63.10, clause 6.9.3 for occupied bandwidth testing.

3.2.4 Test Setup

Emission Bandwidth



3.2.5 Test Result of Emission Bandwidth

Refer as Appendix B

3.3 Maximum Conducted Output Power

3.3.1 Maximum Conducted Output Power Limit

Maximum Conducted Output Power Limit		
	▪ If G_{TX} ≤ 6 dBi, then P_{Out} ≤ 30 dBm (1 W)	
	▪ Point-to-multipoint systems (P2M): If G_{TX} > 6 dBi, then P_{Out} = 30 – (G_{TX} – 6) dBm	
	▪ Point-to-point systems (P2P): If G_{TX} > 6 dBi, then P_{Out} = 30 – (G_{TX} – 6)/3 dBm	
	▪ Smart antenna system (SAS):	
		- Single beam: If G_{TX} > 6 dBi, then P_{Out} = 30 – (G_{TX} – 6)/3 dBm
		- Overlap beam: If G_{TX} > 6 dBi, then P_{Out} = 30 – (G_{TX} – 6)/3 dBm
		- Aggregate power on all beams: If G_{TX} > 6 dBi, then P_{Out} = 30 – (G_{TX} – 6)/3 + 8dB dBm
e.i.r.p. Power Limit:		
▪ 2400-2483.5 MHz Band		
	▪ Point-to-multipoint systems (P2M): P_{eirp} ≤ 36 dBm (4 W)	
	▪ Point-to-point systems (P2P): P_{eirp} ≤ MAX(36, [P_{Out} + G_{TX}]) dBm	
	▪ Smart antenna system (SAS)	
		- Single beam: P_{eirp} ≤ MAX(36, P_{Out} + G_{TX}) dBm
		- Overlap beam: P_{eirp} ≤ MAX(36, P_{Out} + G_{TX}) dBm
		- Aggregate power on all beams: P_{eirp} ≤ MAX(36, [P_{Out} + G_{TX} + 8]) dBm
P_{Out} = maximum peak conducted output power or maximum conducted output power in dBm, **G_{TX}** = the maximum transmitting antenna directional gain in dBi.		

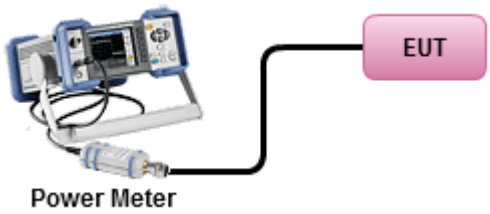
3.3.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.3.3 Test Procedures

Test Method	
▪ Maximum Peak Conducted Output Power	
	☐ Refer as KDB 558074, clause 9.1.1 Option 1 (RBW ≥ EBW method).
	☐ Refer as KDB 558074, clause 9.1.2 Option 2 (integrated band power method)
	☐ Refer as KDB 558074, clause 9.1.3 Option 3 (peak power meter for VBW ≥ DTS BW)
▪ Maximum Average Conducted Output Power	
	Duty cycle ≥ 98%
	☐ Refer as KDB 558074, clause 9.2.2.4 Method AVGSA-2 (spectral trace averaging).
	Duty cycle < 98%
	☐ Refer as KDB 558074, clause 9.2.2.5 Method AVGSA-2 Alt. (slow sweep speed)
	RF power meter and average over on/off periods with duty factor or gated trigger
	☒ Refer as KDB 558074, clause 9.2.3.1 Method AVGPM (using an RF average power meter).
▪ For conducted measurement.	
	▪ If the EUT supports multiple transmit chains using options given below: Refer as KDB 662911, In-band power measurements. Using the measure-and-sum approach, measured all transmit ports individually. Sum the power (in linear power units e.g., mW) of all ports for each individual sample and save them.
	▪ If multiple transmit chains, EIRP calculation could be following as methods: $P_{total} = P_1 + P_2 + \ldots + P_n$ (calculated in linear unit [mW] and transfer to log unit [dBm]) $EIRP_{total} = P_{total} + DG$

3.3.4 Test Setup

Maximum Conducted Output Power (Power Meter)


3.3.5 Test Result of Maximum Conducted Output Power

Refer as Appendix C

3.4 Power Spectral Density

3.4.1 Power Spectral Density Limit

Power Spectral Density Limit
▪ Power Spectral Density (PSD)≤8 dBm/3kHz

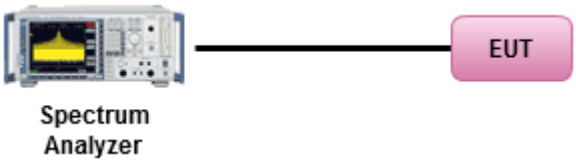
3.4.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.4.3 Test Procedures

Test Method		
▪ Peak power spectral density procedures that the same method as used to determine the conducted output power. If maximum peak conducted output power was measured to demonstrate compliance to the output power limit, then the peak PSD procedure below (Method PKPSD) shall be used. If maximum conducted output power was measured to demonstrate compliance to the output power limit, then one of the average PSD procedures shall be used, as applicable based on the following criteria (the peak PSD procedure is also an acceptable option).		
	☒ Refer as KDB 558074, clause 10.2 Method PKPSD (RBW=3-100kHz; Detector=peak).	
▪ For conducted measurement.		
	▪ If The EUT supports multiple transmit chains using options given below:	
		▪ Measure and sum the spectra across the outputs. Refer as KDB 662911, In-band power spectral density (PSD). Sample all transmit ports simultaneously using a spectrum analyzer for each transmit port. Where the trace bin-by-bin of each transmit port summing can be performed. (i.e., in the first spectral bin of output 1 is summed with that in the first spectral bin of output 2 and that from the first spectral bin of output 3, and so on up to the NTX output to obtain the value for the first frequency bin of the summed spectrum.). Add up the amplitude (power) values for the different transmit chains and use this as the new data trace.

3.4.4 Test Setup

Power Spectral Density


3.4.5 Test Result of Power Spectral Density

Refer as Appendix D

3.5 Emissions in Non-restricted Frequency Bands

3.5.1 Emissions in Non-restricted Frequency Bands Limit

Un-restricted Band Emissions Limit	
RF output power procedure	**Limit (dB)**
Peak output power procedure	20
Average output power procedure	30
Note 1: If the peak output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum measured in-band peak PSD level. Note 2: If the average output power procedure is used to measure the fundamental emission power to demonstrate compliance to requirements, then the power in any 100 kHz outside of the authorized frequency band shall be attenuated by at least 30 dB relative to the maximum measured in-band average PSD level.	

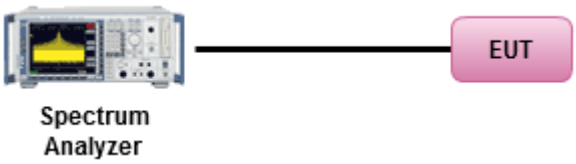
3.5.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.5.3 Test Procedures

Test Method
▪ Refer as KDB 558074, clause 11 for unwanted emissions into non-restricted bands.

3.5.4 Test Setup

Emissions in Non-restricted Frequency Bands


3.5.5 Test Result of Emissions in Non-restricted Frequency Bands

Refer as Appendix E

3.6 Emissions in Restricted Frequency Bands

3.6.1 Emissions in Restricted Frequency Bands Limit

Restricted Band Emissions Limit			
Frequency Range (MHz)	**Field Strength (uV/m)**	**Field Strength (dBuV/m)**	**Measure Distance (m)**
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB / decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Note 3: Using the distance of 1m during the test for above 18 GHz, and the test value to correct for the distance factor at 3m.

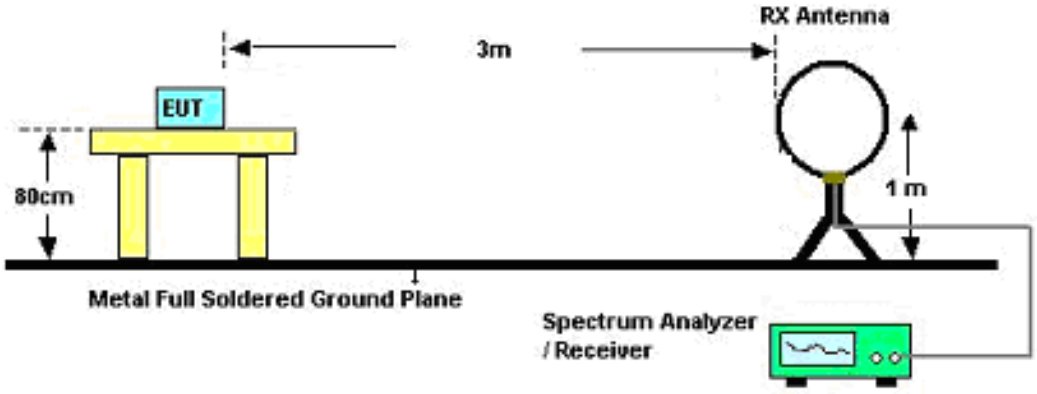
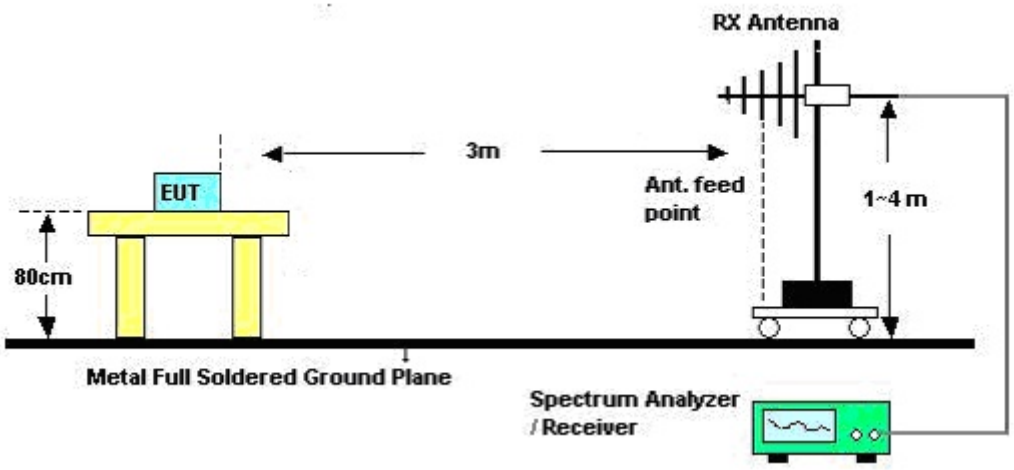
3.6.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

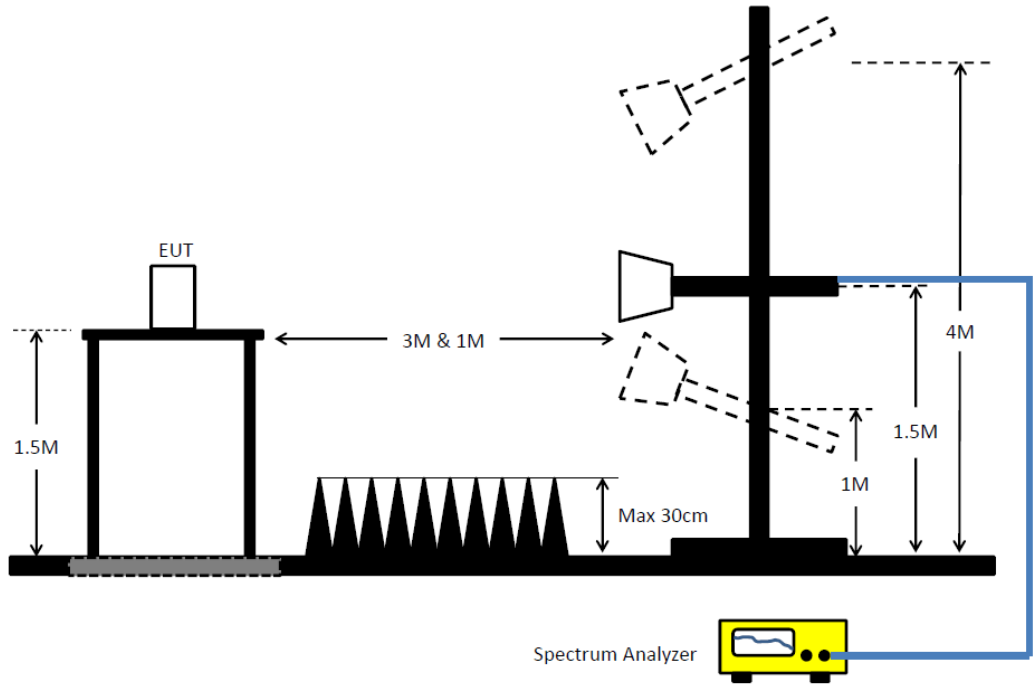
3.6.3 Test Procedures

Test Method
▪ The average emission levels shall be measured in [duty cycle ≥ 98 or duty factor].
▪ Refer as ANSI C63.10, clause 6.10.3 band-edge testing shall be performed at the lowest frequency channel and highest frequency channel within the allowed operating band.
▪ For the transmitter unwanted emissions shall be measured using following options below:
▪ Refer as KDB 558074, clause 12 for unwanted emissions into restricted bands.
☒ Refer as KDB 558074, clause 12.2.5.3 (ANSI C63.10, clause 4.1.4.2.3), Reduced VBW≥1/T.
☒ Refer as KDB 558074, clause 12.2.4 measurement procedure peak limit.
▪ For the transmitter band-edge emissions shall be measured using following options below:
▪ Refer as KDB 558074 clause 13.1, When the performing peak or average radiated measurements, emissions within 2 MHz of the authorized band edge may be measured using the marker-delta method described below.
▪ Refer as KDB 558074, clause 13.2 (ANSI C63.10, clause 6.10.6) for marker-delta method for band-edge measurements.
▪ Refer as KDB 558074, clause 13.3 for narrower resolution bandwidth (100kHz) using the band power and summing the spectral levels (i.e., 1 MHz).
▪ For conducted and cabinet radiation measurement, refer as KDB 558074, clause 12.2.2.
▪ For conducted unwanted emissions into restricted bands (absolute emission limits). Devices with multiple transmit chains using options given below: (1) Measure and sum the spectra across the outputs or (2) Measure and add 10 log(N) dB
▪ For KDB 662911 The methodology described here may overestimate array gain, thereby resulting in apparent failures to satisfy the out-of-band limits even if the device is actually compliant. In such cases, compliance may be demonstrated by performing radiated tests around the frequencies at which the apparent failures occurred.

3.6.4 Test Setup

Emissions in Restricted Frequency Bands
9kHz ~30MHz

30MHz~1GHz


Above 1GHz



3.6.5 Test Result of Emissions in Restricted Frequency Bands (Below 30MHz)

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

3.6.6 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix F

4 Test Equipment and Calibration Data

Instrument for AC Conduction

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
EMC Receiver	R&S	ESCS30	838251/003	9KHz ~ 2.75GHz	13/Jun/2017	12/Jun/2018
LISN	R&S	ENV216	101295	9kHz ~ 30MHz	17/Nov/2017	16/Nov/2018
RF Cable-CON	HUBER+SUHNER	RG213/U	07611832020001	9kHz ~ 30MHz	06/Oct/2017	05/Oct/2018
AC POWER	APC	AFC-11005G	F310050055	47Hz~63Hz 5~300V	NCR	NCR
Impuls Begrenzer Pulse Limiter	SCHWARZBECK	VTSD 9561-F	9561-F041	9 kHz ~ 30 MHz	12/Oct/2017	11/Oct/2018

NCR : Non-Calibration Require

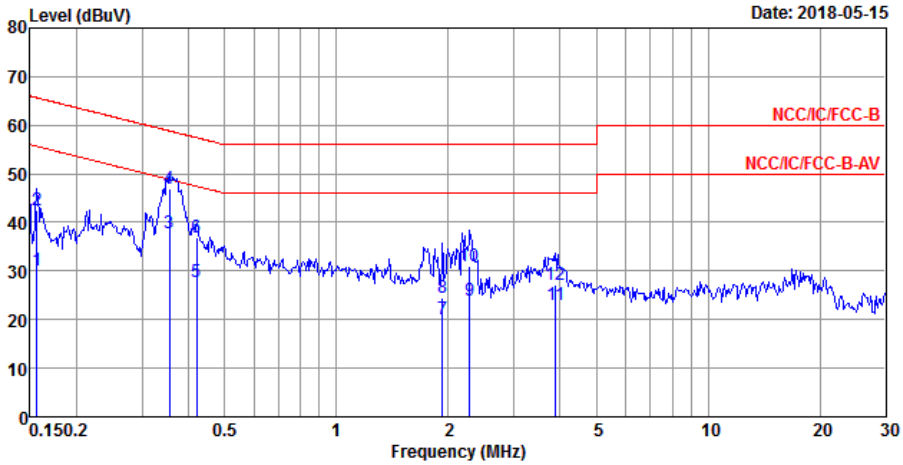
Instrument for Conducted Test

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
Spectrum Analyzer	R&S	FSV 40	101013	9kHz~40GHz	29/Dec/2017	28/Dec/2018
Signal Generator	R&S	SMR40	100116	10MHz ~ 40GHz	27/Jul/2017	26/Jul/2018
Power Sensor	Anritsu	MA2411B	0917017	300MHz ~ 40GHz	05/Feb/2018	04/Feb/2019
Power Meter	Anritsu	ML2495A	0949003	300MHz ~ 40GHz	05/Feb/2018	04/Feb/2019
RF Cable-0.2m	HUBER+SUHNER	SUCOFLEX_104	MY10709/4	30MHz ~ 26.5GHz	25/Aug/2017	24/Aug/2018
RF Cable-0.2m	HUBER+SUHNER	SUCOFLEX_104	MY10712/4	30MHz ~ 26.5GHz	25/Aug/2017	24/Aug/2018
RF Cable-0.5m	HUBER+SUHNER	SUCOFLEX_104	MY10713/4	30MHz ~ 26.5GHz	25/Aug/2017	24/Aug/2018

Instrument for Radiated Test

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz ~ 1GHz 3m	31/Oct/2017	30/Oct/2018
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	1GHz ~ 18GHz 3m	01/Nov/2017	31/Oct/2018
Amplifier	HP	8447D	2944A08033	10kHz ~ 1.3GHz	23/Apr/2018	22/Apr/2019
Amplifier	Keysight	83017A	MY53270196	1GHz ~ 26.5GHz	31/Aug/2017	30/Aug/2018
Spectrum	R&S	FSV40	101500	9kHz ~ 40GHz	28/Jun/2017	27/Jun/2018
Receiver	R&S	ESR3	102052	9KHz ~ 3.6GHz	29/Apr/2017	28/Apr/2018
RF Cable-R03m	Jye Bao	RG142	CB021	9kHz ~ 1GHz	26/Jan/2018	25/Jan/2019
RF Cable-high	SUHNER	SUCOFLEX106	CB222	1GHz ~ 40GHz	26/Jan/2018	25/Jan/2019
Bilog Antenna	SCHAFFNER	CBL 6112B	22237	30MHz ~ 1GHz	08/Jul/2017	07/Jul/2018
Horn Antenna	SCHWARZBECK	BBHA9170	BBHA9170154	18GHz ~ 40GHz	09/Feb/ 2018	08/Feb/2019
Horn Antenna	SCHWARZBECK	BBHA9120D	1531	1GHz ~ 18GHz	18/Apr/ 2018	17/Apr/2019
Loop Antenna	TESEQ	HLA 6120	31244	9 kHz~30 MHz	16/Mar/2018	15/Mar/2019

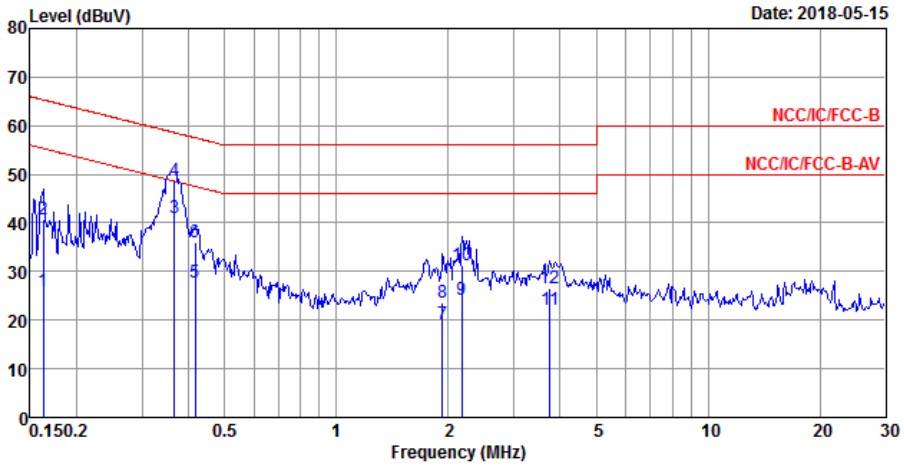
AC Power-line Conducted Emissions Result			
Operating Mode	1	**Power Phase**	Neutral
Operating Function	Adapter mode ; BT TX		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.16	30.14	-25.51	55.65	20.47	9.63	0.04	Average
2	0.16	42.58	-23.07	65.65	32.91	9.63	0.04	QP
3 MAX	0.36	37.93	-10.90	48.83	28.24	9.61	0.08	Average
4	0.36	46.83	-12.00	58.83	37.14	9.61	0.08	QP
5	0.42	27.63	-19.79	47.42	17.93	9.61	0.09	Average
6	0.42	36.90	-20.52	57.42	27.20	9.61	0.09	QP
7	1.93	20.17	-25.83	46.00	10.54	9.63	0.00	Average
8	1.93	24.59	-31.41	56.00	14.96	9.63	0.00	QP
9	2.28	23.81	-22.19	46.00	14.16	9.63	0.02	Average
10	2.28	31.12	-24.88	56.00	21.47	9.63	0.02	QP
11	3.88	22.89	-23.11	46.00	13.17	9.64	0.08	Average
12	3.88	27.04	-28.96	56.00	17.32	9.64	0.08	QP

Note 1: “>20dB” means emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found emissions (No emissions were detected.)

AC Power-line Conducted Emissions Result			
Operating Mode	1	**Power Phase**	Line
Operating Function	Adapter mode ; BT TX		



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.16	25.84	-29.50	55.34	16.19	9.62	0.03	Average
2	0.16	40.83	-24.51	65.34	31.18	9.62	0.03	QP
3 MAX	0.37	41.01	-7.55	48.56	31.31	9.61	0.09	Average
4	0.37	48.61	-9.95	58.56	38.91	9.61	0.09	QP
5	0.42	27.70	-19.81	47.51	17.99	9.61	0.10	Average
6	0.42	35.94	-21.57	57.51	26.23	9.61	0.10	QP
7	1.93	19.27	-26.73	46.00	9.65	9.62	0.00	Average
8	1.93	23.52	-32.48	56.00	13.90	9.62	0.00	QP
9	2.18	24.21	-21.79	46.00	14.58	9.62	0.01	Average
10	2.18	31.35	-24.65	56.00	21.72	9.62	0.01	QP
11	3.76	22.13	-23.87	46.00	12.42	9.63	0.08	Average
12	3.76	26.43	-29.57	56.00	16.72	9.63	0.08	QP

Note 1: “>20dB” means emission levels that exceed the level of 20 dB below the applicable limit.
Note 2: “N/F” means Nothing Found emissions (No emissions were detected.)

Summary

Mode	Max-N dB (Hz)	Max-OBW (Hz)	ITU-Code	Min-N dB (Hz)	Min-OBW (Hz)
2.4-2.4835GHz	-	-	-	-	-
BT-LE(1Mbps)	737.5k	1.063M	1M06F1D	697.5k	1.049M

Max-N dB = Maximum 6dB down bandwidth; **Max-OBW** = Maximum 99% occupied bandwidth;
Min-N dB = Minimum 6dB down bandwidth; **Min-OBW** = Minimum 99% occupied bandwidth;

Result

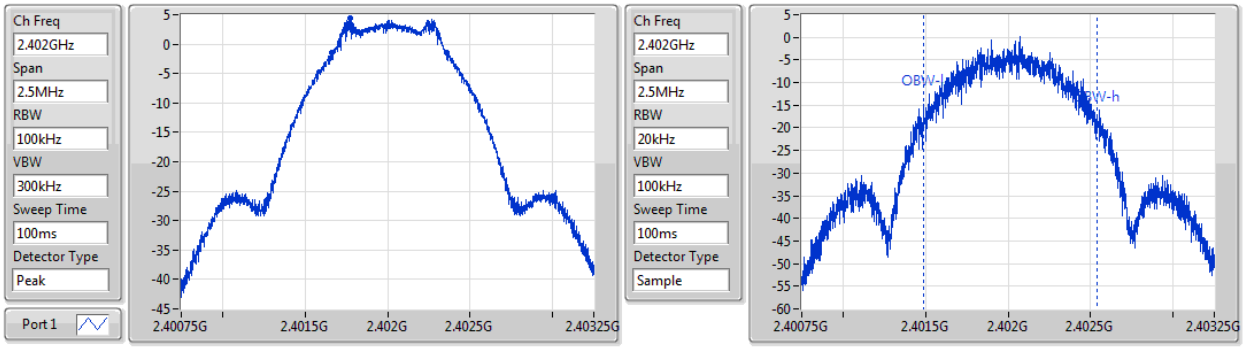
Mode	Result	Limit (Hz)	Port 1-N dB (Hz)	Port 1-OBW (Hz)
BT-LE(1Mbps)	-	-	-	-
2402MHz	Pass	500k	697.5k	1.049M
2440MHz	Pass	500k	698.75k	1.054M
2480MHz	Pass	500k	737.5k	1.063M

Port X-N dB = Port **X** 6dB down bandwidth; **Port X-OBW** = Port **X** 99% occupied bandwidth;

BT-LE(1Mbps) **EBW**

2402MHz

03/05/2018

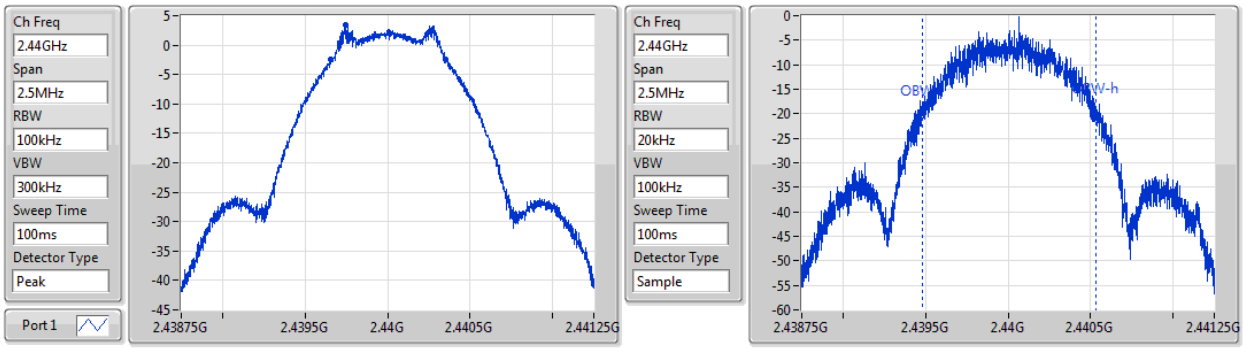


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
697.5k	2.401664G	2.402361G	1.049M	2.401488G	2.402537G	500k	1

BT-LE(1Mbps) **EBW**

2440MHz

04/05/2018

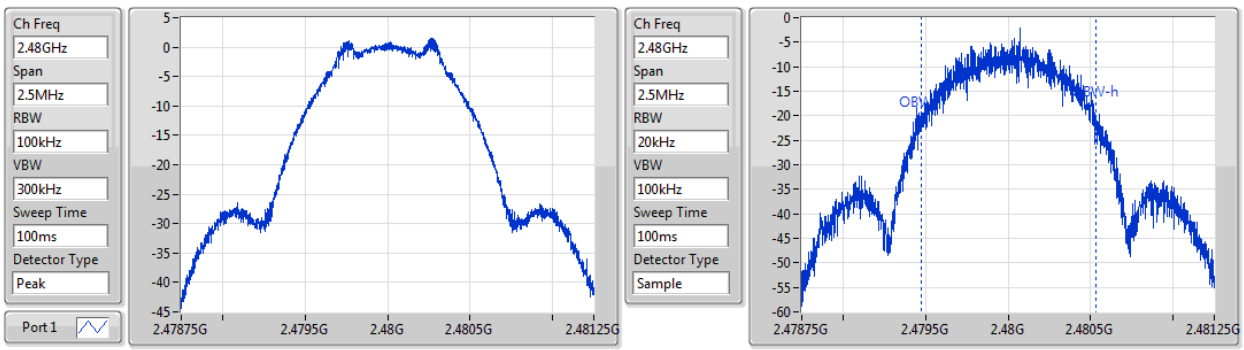


6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
698.75k	2.439654G	2.440353G	1.054M	2.439479G	2.440533G	500k	1

BT-LE(1Mbps) **EBW**

2480MHz

04/05/2018



6dB(Hz)	Fl-6dB(Hz)	Fh-6dB(Hz)	OBW(Hz)	Fl-OBW(Hz)	Fh-OBW(Hz)	Limit(Hz)	Port
737.5k	2.479639G	2.480376G	1.063M	2.479472G	2.480535G	500k	1

Summary

Mode	Power	Power
	(dBm)	(W)
2.4-2.4835GHz	-	-
BT-LE(1Mbps)	3.41	0.00219

Result

Mode	Result	Gain (dBi)	Power (dBm)	Power Limit (dBm)
BT-LE(1Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	2.93	3.41	30.00
2440MHz_TnomVnom	Pass	2.93	3.21	30.00
2480MHz_TnomVnom	Pass	2.93	1.54	30.00

Summary

Mode	PD (dBm/RBW)
2.4-2.4835GHz	-
BT-LE(1Mbps)	-10.26

RBW=3kHz.

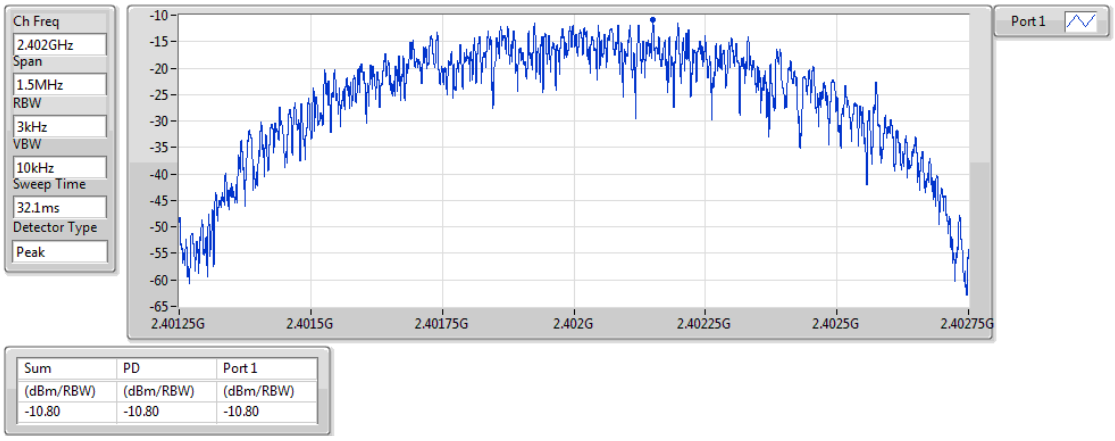
Result

Mode	Result	Gain (dBi)	PD (dBm/RBW)	PD Limit (dBm/RBW)
BT-LE(1Mbps)	-	-	-	-
2402MHz_TnomVnom	Pass	2.93	-10.80	8.00
2440MHz_TnomVnom	Pass	2.93	-10.26	8.00
2480MHz_TnomVnom	Pass	2.93	-13.07	8.00

RBW=3kHz.

BT-LE(1Mbps) **PSD**

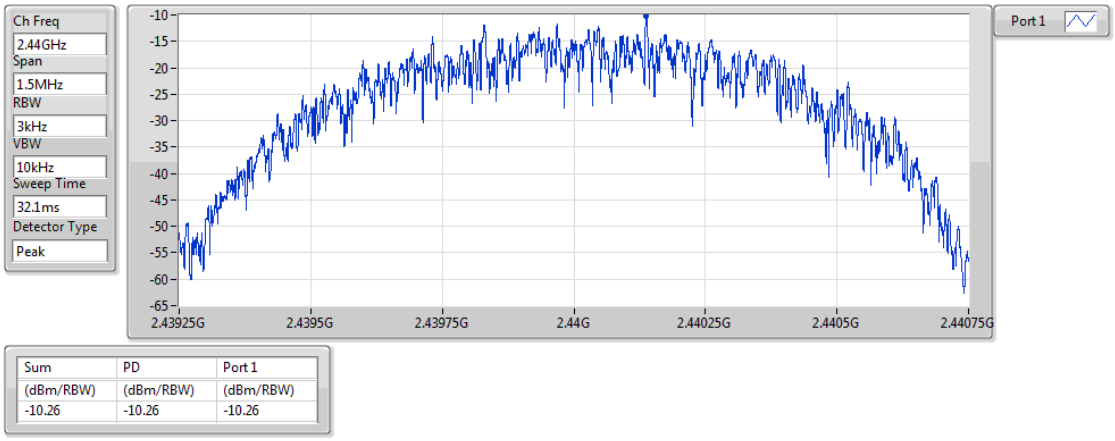
2402MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-10.80	-10.80	-10.80

BT-LE(1Mbps) **PSD**

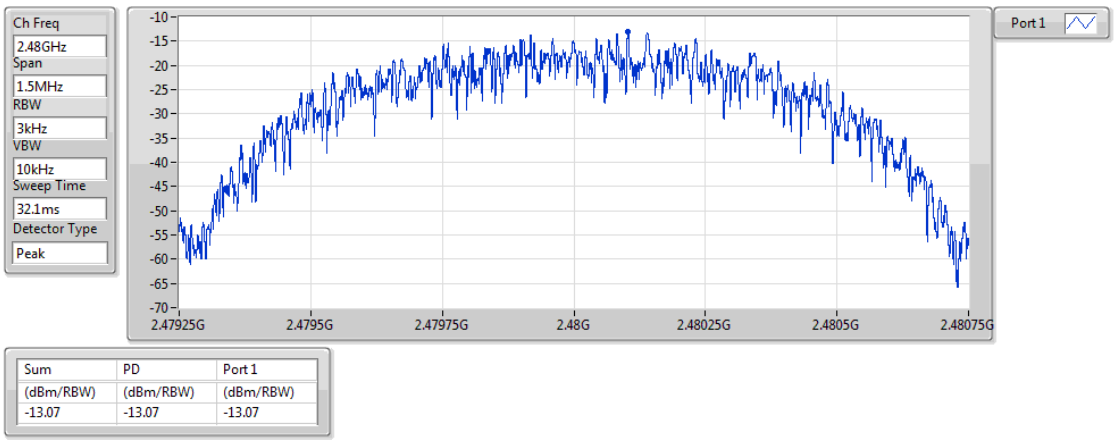
2440MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-10.26	-10.26	-10.26

BT-LE(1Mbps) **PSD**

2480MHz



Sum	PD	Port 1
(dBm/RBW)	(dBm/RBW)	(dBm/RBW)
-13.07	-13.07	-13.07

Summary

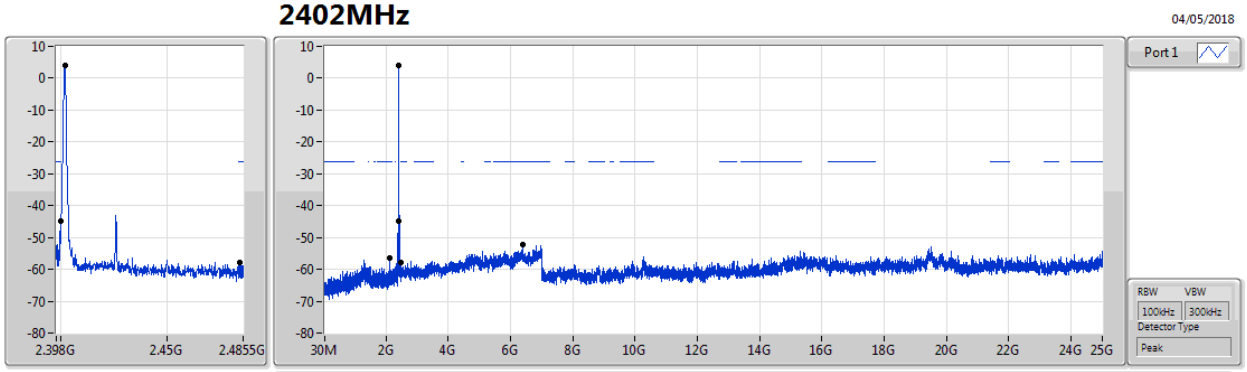
Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	2.402004G	3.89	-26.11	2.102G	-56.39	2.399988G	-44.75	2.484G	-57.96	6.377694G	-52.12	1

Result

Mode	Result	Ref (Hz)	Ref (dBm)	Limit (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Freq (Hz)	Level (dBm)	Port
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	2.402004G	3.89	-26.11	2.102G	-56.39	2.399988G	-44.75	2.484G	-57.96	6.377694G	-52.12	1
2440MHz	Pass	2.402004G	3.89	-26.11	2.135152G	-59.46	2.399576G	-56.27	2.485236G	-57.34	6.994029G	-51.67	1
2480MHz	Pass	2.402004G	3.89	-26.11	2.110288G	-59.57	2.398112G	-58.53	2.485492G	-55.65	2.502386G	-48.69	1

BT-LE(1Mbps) **CSE NdB**

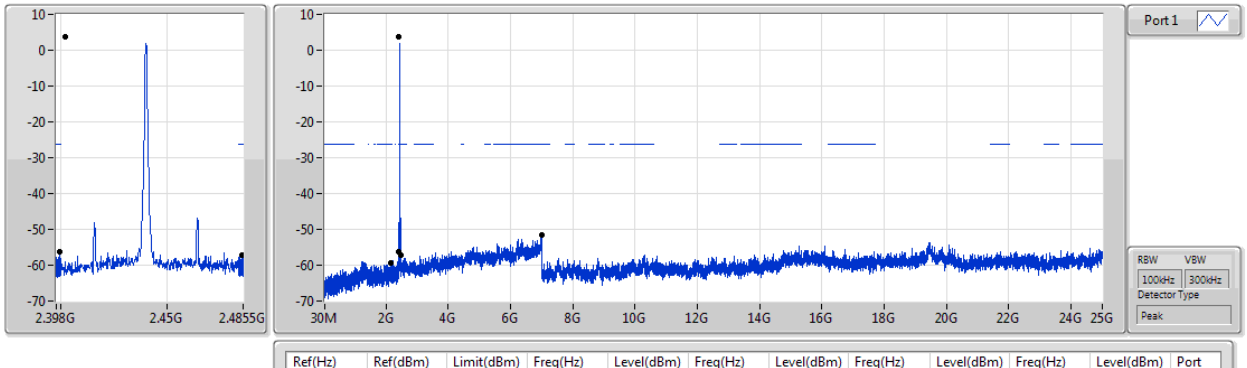
2402MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.402004G	3.89	-26.11	2.102G	-56.39	2.399988G	-44.75	2.484G	-57.96	6.377694G	-52.12	1

BT-LE(1Mbps) **CSE NdB**

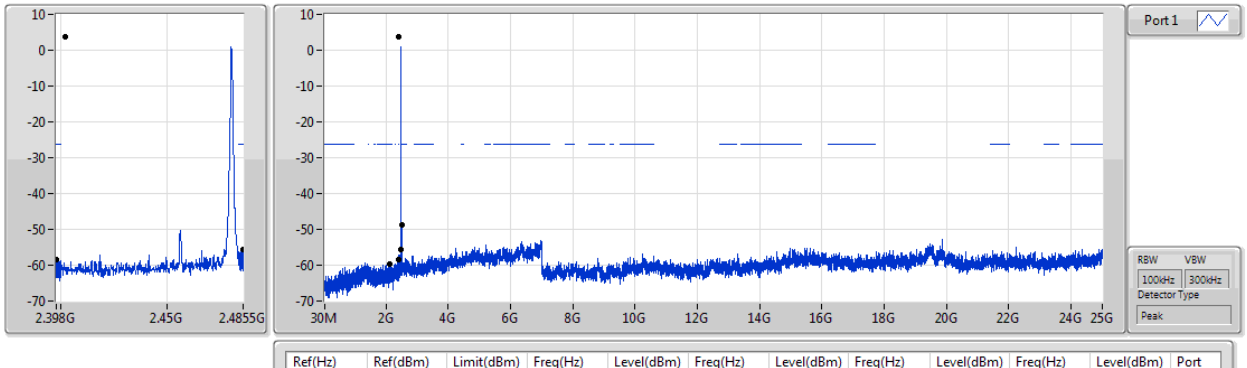
2440MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.402004G	3.89	-26.11	2.135152G	-59.46	2.399576G	-56.27	2.485236G	-57.34	6.994029G	-51.67	1

BT-LE(1Mbps) **CSE NdB**

2480MHz



Ref(Hz)	Ref(dBm)	Limit(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Freq(Hz)	Level(dBm)	Port
2.402004G	3.89	-26.11	2.110288G	-59.57	2.398112G	-58.53	2.485492G	-55.65	2.502386G	-48.69	1

Summary

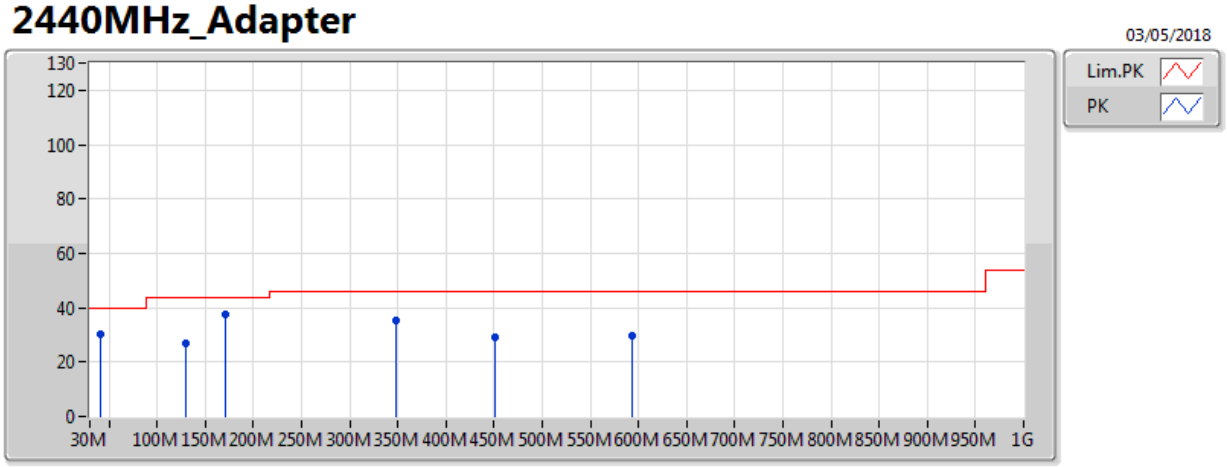
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	QP	171.62M	38.34	43.50	-5.16	-9.84	3	Horizontal	292	1.55	-

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-
2440MHz	Pass	PK	222.06M	34.50	46.00	-11.50	-9.74	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	235.64M	29.65	46.00	-16.35	-8.23	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	348.16M	38.13	46.00	-7.87	-4.68	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	588.72M	30.45	46.00	-15.55	-0.61	3	Horizontal	0	1.00	-
2440MHz	Pass	PK	763.32M	30.26	46.00	-15.74	1.63	3	Horizontal	0	1.00	-
2440MHz	Pass	QP	171.62M	38.34	43.50	-5.16	-9.84	3	Horizontal	292	1.55	-
2440MHz	Pass	PK	41.64M	30.00	40.00	-10.00	-8.84	3	Vertical	360	1.00	-
2440MHz	Pass	PK	128.94M	27.00	43.50	-16.50	-7.72	3	Vertical	360	1.00	-
2440MHz	Pass	PK	171.62M	37.27	43.50	-6.23	-9.84	3	Vertical	360	1.00	-
2440MHz	Pass	PK	348.16M	35.08	46.00	-10.92	-4.68	3	Vertical	360	1.00	-
2440MHz	Pass	PK	450.98M	28.86	46.00	-17.14	-2.36	3	Vertical	360	1.00	-
2440MHz	Pass	PK	592.6M	29.62	46.00	-16.38	-0.58	3	Vertical	360	1.00	-

BT-LE(1Mbps)

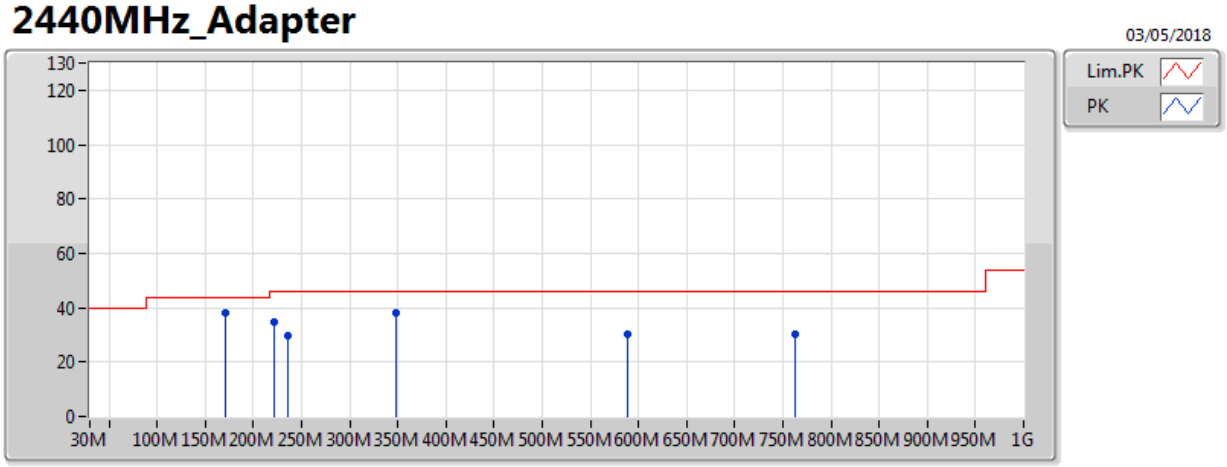
2440MHz_Adapter



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	41.64M	30.00	40.00	-10.00	-8.84	3	Vertical	360	1.00	-	38.84	16.84	1.85	27.53
PK	128.94M	27.00	43.50	-16.50	-7.72	3	Vertical	360	1.00	-	34.72	17.14	2.37	27.23
PK	171.62M	37.27	43.50	-6.23	-9.84	3	Vertical	360	1.00	-	47.11	14.68	2.52	27.03
PK	348.16M	35.08	46.00	-10.92	-4.68	3	Vertical	360	1.00	-	39.76	19.32	2.95	26.95
PK	450.98M	28.86	46.00	-17.14	-2.36	3	Vertical	360	1.00	-	31.22	21.76	3.43	27.55
PK	592.6M	29.62	46.00	-16.38	-0.58	3	Vertical	360	1.00	-	30.20	23.65	3.71	27.94

BT-LE(1Mbps)

2440MHz_Adapter



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
PK	222.06M	34.50	46.00	-11.50	-9.74	3	Horizontal	0	1.00	-	44.24	14.56	2.55	26.84
PK	235.64M	29.65	46.00	-16.35	-8.23	3	Horizontal	0	1.00	-	37.88	16.01	2.57	26.81
PK	348.16M	38.13	46.00	-7.87	-4.68	3	Horizontal	0	1.00	-	42.81	19.32	2.95	26.95
PK	588.72M	30.45	46.00	-15.55	-0.61	3	Horizontal	0	1.00	-	31.06	23.62	3.71	27.94
PK	763.32M	30.26	46.00	-15.74	1.63	3	Horizontal	0	1.00	-	28.63	24.96	4.45	27.79
QP	171.62M	38.34	43.50	-5.16	-9.84	3	Horizontal	292	1.55	-	48.18	14.68	2.52	27.03

Summary

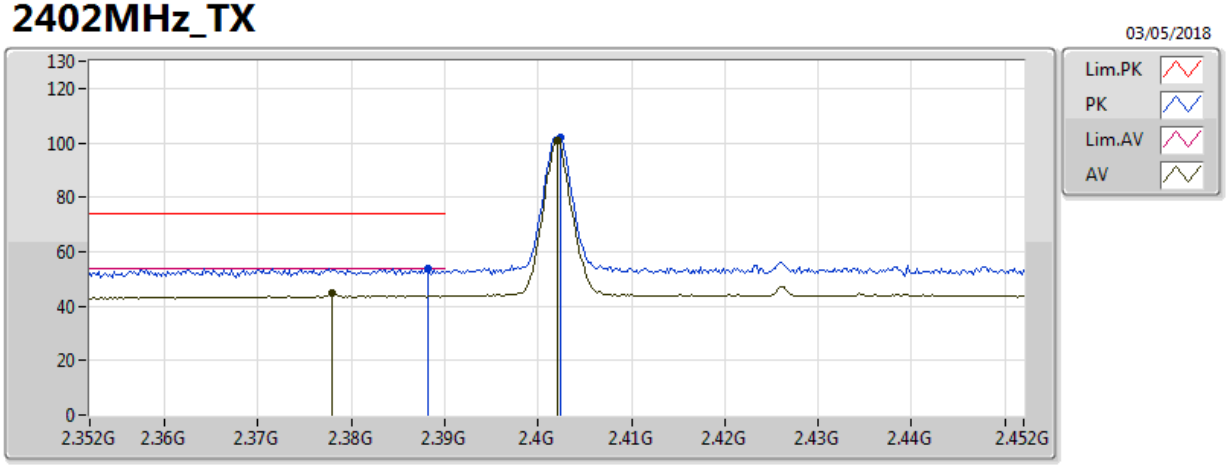
Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
2.4-2.4835GHz	-	-	-	-	-	-	-	-	-	-	-	-
BT-LE(1Mbps)	Pass	AV	2.483502G	53.83	54.00	-0.17	30.69	3	Horizontal	9	2.69	-

Result

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comments
BT-LE(1Mbps)	-	-	-	-	-	-	-	-	-	-	-	-
2402MHz	Pass	AV	2.378G	48.32	54.00	-5.68	30.34	3	Horizontal	161	1.14	-
2402MHz	Pass	AV	2.402G	105.19	Inf	-Inf	30.42	3	Horizontal	161	1.14	-
2402MHz	Pass	PK	2.3784G	57.71	74.00	-16.29	30.34	3	Horizontal	161	1.14	-
2402MHz	Pass	PK	2.4024G	106.39	Inf	-Inf	30.42	3	Horizontal	161	1.14	-
2402MHz	Pass	AV	2.378G	44.88	54.00	-9.12	30.34	3	Vertical	170	2.04	-
2402MHz	Pass	AV	2.402G	100.92	Inf	-Inf	30.42	3	Vertical	170	2.04	-
2402MHz	Pass	PK	2.3882G	54.01	74.00	-19.99	30.37	3	Vertical	170	2.04	-
2402MHz	Pass	PK	2.4024G	102.07	Inf	-Inf	30.42	3	Vertical	170	2.04	-
2402MHz	Pass	AV	4.80404G	47.52	54.00	-6.48	5.79	3	Horizontal	246	1.05	-
2402MHz	Pass	PK	4.80362G	54.17	74.00	-19.83	5.79	3	Horizontal	246	1.05	-
2402MHz	Pass	AV	4.8041G	49.88	54.00	-4.12	5.79	3	Vertical	258	1.03	-
2402MHz	Pass	PK	4.80442G	56.41	74.00	-17.59	5.79	3	Vertical	258	1.03	-
2440MHz	Pass	AV	2.3868G	43.40	54.00	-10.60	30.37	3	Horizontal	10	2.13	-
2440MHz	Pass	AV	2.44G	105.58	Inf	-Inf	30.55	3	Horizontal	10	2.13	-
2440MHz	Pass	AV	2.488G	44.62	54.00	-9.38	30.71	3	Horizontal	10	2.13	-
2440MHz	Pass	PK	2.348G	53.82	74.00	-20.18	30.24	3	Horizontal	10	2.13	-
2440MHz	Pass	PK	2.4404G	106.94	Inf	-Inf	30.55	3	Horizontal	10	2.13	-
2440MHz	Pass	PK	2.4916G	55.37	74.00	-18.63	30.72	3	Horizontal	10	2.13	-
2440MHz	Pass	AV	2.389998G	43.51	54.00	-10.49	30.38	3	Vertical	169	1.75	-
2440MHz	Pass	AV	2.44G	100.42	Inf	-Inf	30.55	3	Vertical	169	1.75	-
2440MHz	Pass	AV	2.4956G	44.13	54.00	-9.87	30.74	3	Vertical	169	1.75	-
2440MHz	Pass	PK	2.3844G	54.71	74.00	-19.29	30.36	3	Vertical	169	1.75	-
2440MHz	Pass	PK	2.4404G	101.82	Inf	-Inf	30.55	3	Vertical	169	1.75	-
2440MHz	Pass	PK	2.4992G	55.16	74.00	-18.84	30.75	3	Vertical	169	1.75	-
2440MHz	Pass	AV	4.8801G	44.72	54.00	-9.28	5.95	3	Horizontal	28	1.12	-
2440MHz	Pass	AV	7.31942G	46.26	54.00	-7.74	11.14	3	Horizontal	28	1.17	-
2440MHz	Pass	PK	4.8795G	51.37	74.00	-22.63	5.95	3	Horizontal	28	1.12	-
2440MHz	Pass	PK	7.32092G	55.49	74.00	-18.51	11.15	3	Horizontal	28	1.17	-
2440MHz	Pass	AV	4.88008G	48.41	54.00	-5.59	5.95	3	Vertical	257	1.16	-
2440MHz	Pass	AV	7.31942G	50.46	54.00	-3.54	11.14	3	Vertical	173	1.18	-
2440MHz	Pass	PK	4.87958G	53.87	74.00	-20.13	5.95	3	Vertical	257	1.16	-
2440MHz	Pass	PK	7.32084G	59.81	74.00	-14.19	11.15	3	Vertical	173	1.18	-
2480MHz	Pass	AV	2.48G	105.89	Inf	-Inf	30.68	3	Horizontal	9	2.69	-
2480MHz	Pass	AV	2.483502G	53.83	54.00	-0.17	30.69	3	Horizontal	9	2.69	-
2480MHz	Pass	PK	2.4798G	107.16	Inf	-Inf	30.68	3	Horizontal	9	2.69	-
2480MHz	Pass	PK	2.483502G	59.97	74.00	-14.03	30.69	3	Horizontal	9	2.69	-
2480MHz	Pass	AV	2.4802G	99.33	Inf	-Inf	30.68	3	Vertical	170	1.49	-
2480MHz	Pass	AV	2.483502G	48.45	54.00	-5.55	30.69	3	Vertical	170	1.49	-
2480MHz	Pass	PK	2.4798G	100.65	Inf	-Inf	30.68	3	Vertical	170	1.49	-
2480MHz	Pass	PK	2.483502G	55.86	74.00	-18.14	30.69	3	Vertical	170	1.49	-
2480MHz	Pass	AV	4.95962G	33.34	54.00	-20.66	6.12	3	Horizontal	40	1.01	-
2480MHz	Pass	PK	4.9607G	45.74	74.00	-28.26	6.12	3	Horizontal	40	1.01	-
2480MHz	Pass	AV	4.95962G	33.84	54.00	-20.16	6.12	3	Vertical	254	1.02	-
2480MHz	Pass	PK	4.95952G	46.30	74.00	-27.70	6.11	3	Vertical	254	1.02	-

BT-LE(1Mbps)

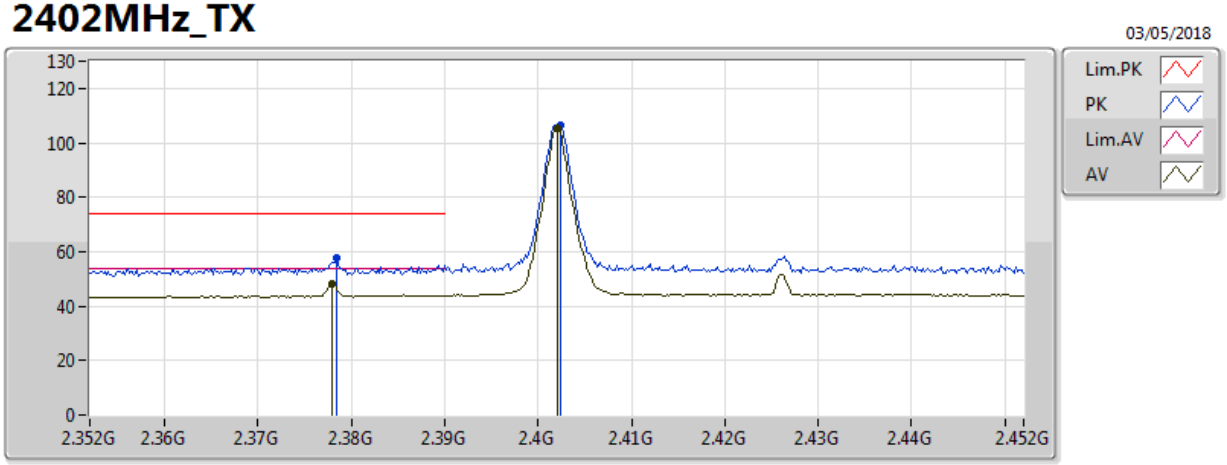
2402MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.378G	44.88	54.00	-9.12	30.34	3	Vertical	170	2.04	-	14.54	27.11	3.23	-
AV	2.402G	100.92	Inf	-Inf	30.42	3	Vertical	170	2.04	-	70.50	27.16	3.25	-
PK	2.3882G	54.01	74.00	-19.99	30.37	3	Vertical	170	2.04	-	23.64	27.13	3.24	-
PK	2.4024G	102.07	Inf	-Inf	30.42	3	Vertical	170	2.04	-	71.65	27.17	3.25	-

BT-LE(1Mbps)

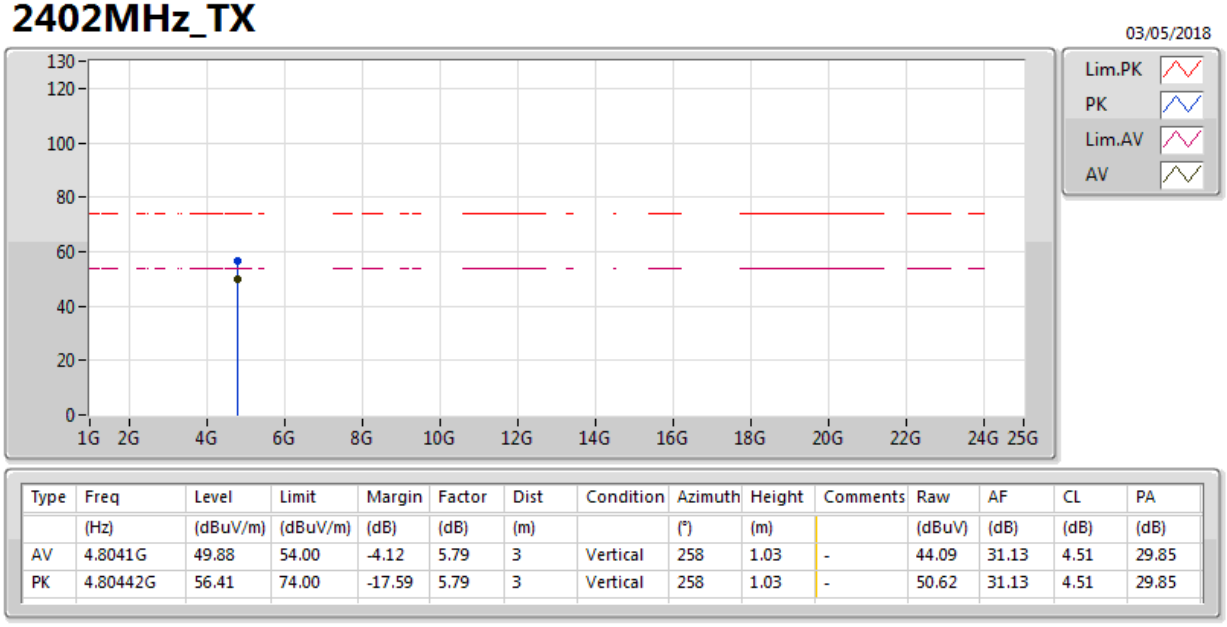
2402MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.378G	48.32	54.00	-5.68	30.34	3	Horizontal	161	1.14	-	17.98	27.11	3.23	-
AV	2.402G	105.19	Inf	-Inf	30.42	3	Horizontal	161	1.14	-	74.77	27.16	3.25	-
PK	2.3784G	57.71	74.00	-16.29	30.34	3	Horizontal	161	1.14	-	27.37	27.11	3.23	-
PK	2.4024G	106.39	Inf	-Inf	30.42	3	Horizontal	161	1.14	-	75.97	27.17	3.25	-

BT-LE(1Mbps)

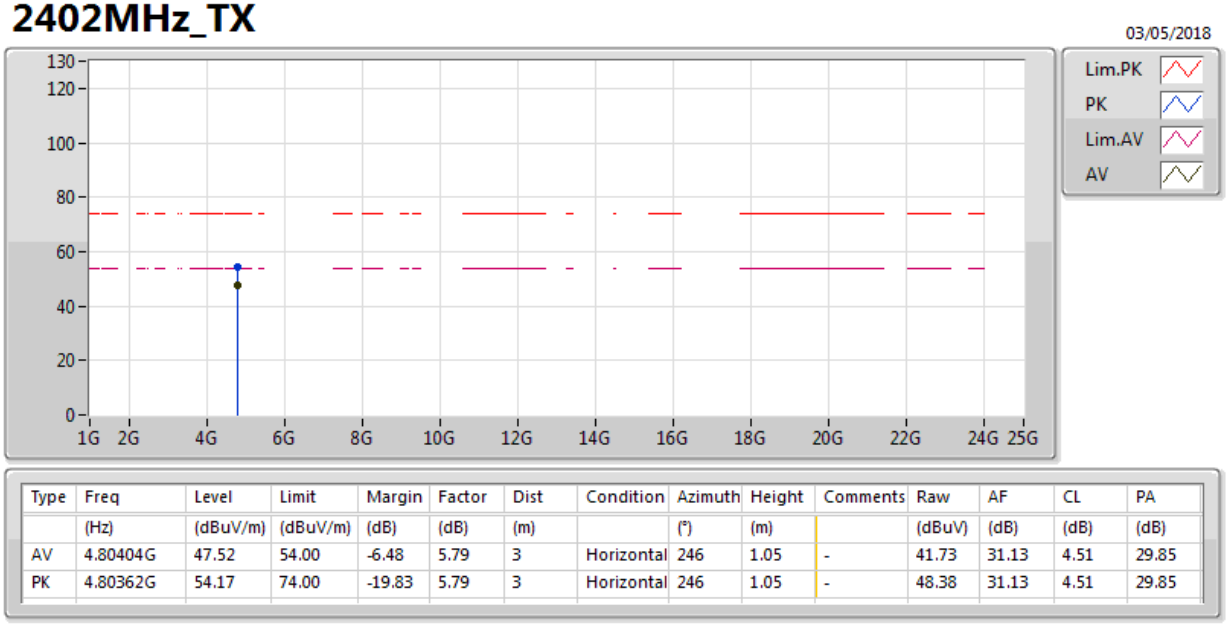
2402MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.8041G	49.88	54.00	-4.12	5.79	3	Vertical	258	1.03	-	44.09	31.13	4.51	29.85
PK	4.80442G	56.41	74.00	-17.59	5.79	3	Vertical	258	1.03	-	50.62	31.13	4.51	29.85

BT-LE(1Mbps)

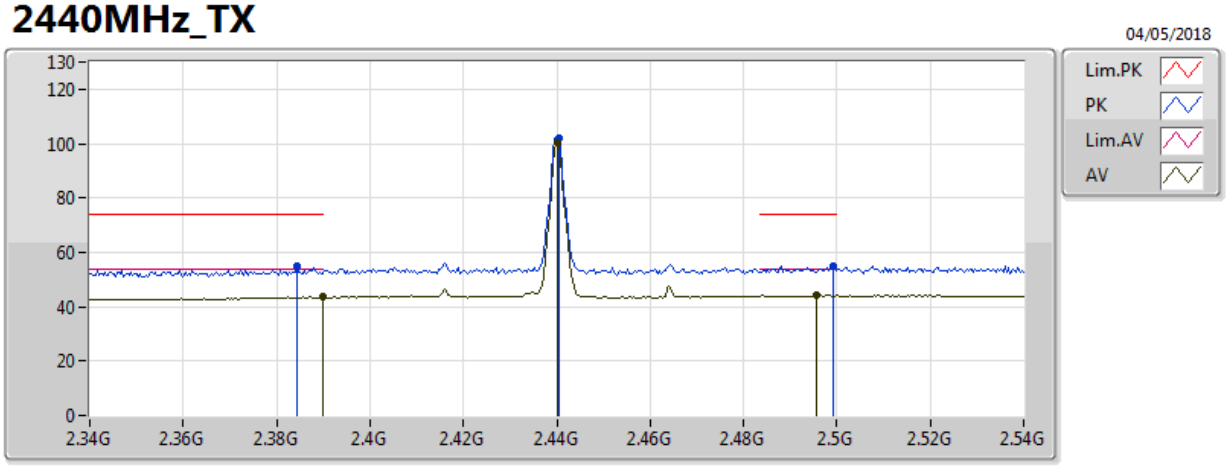
2402MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.80404G	47.52	54.00	-6.48	5.79	3	Horizontal	246	1.05	-	41.73	31.13	4.51	29.85
PK	4.80362G	54.17	74.00	-19.83	5.79	3	Horizontal	246	1.05	-	48.38	31.13	4.51	29.85

BT-LE(1Mbps)

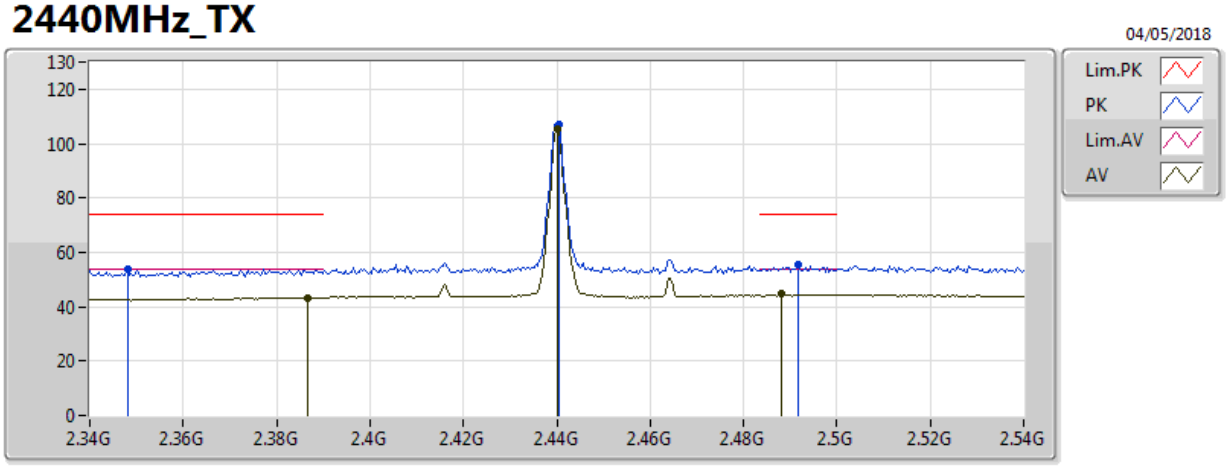
2440MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.389998G	43.51	54.00	-10.49	30.38	3	Vertical	169	1.75	-	13.13	27.14	3.24	-
AV	2.44G	100.42	Inf	-Inf	30.55	3	Vertical	169	1.75	-	69.87	27.26	3.29	-
AV	2.4956G	44.13	54.00	-9.87	30.74	3	Vertical	169	1.75	-	13.39	27.39	3.35	-
PK	2.3844G	54.71	74.00	-19.29	30.36	3	Vertical	169	1.75	-	24.35	27.12	3.24	-
PK	2.4404G	101.82	Inf	-Inf	30.55	3	Vertical	169	1.75	-	71.27	27.26	3.29	-
PK	2.4992G	55.16	74.00	-18.84	30.75	3	Vertical	169	1.75	-	24.41	27.40	3.35	-

BT-LE(1Mbps)

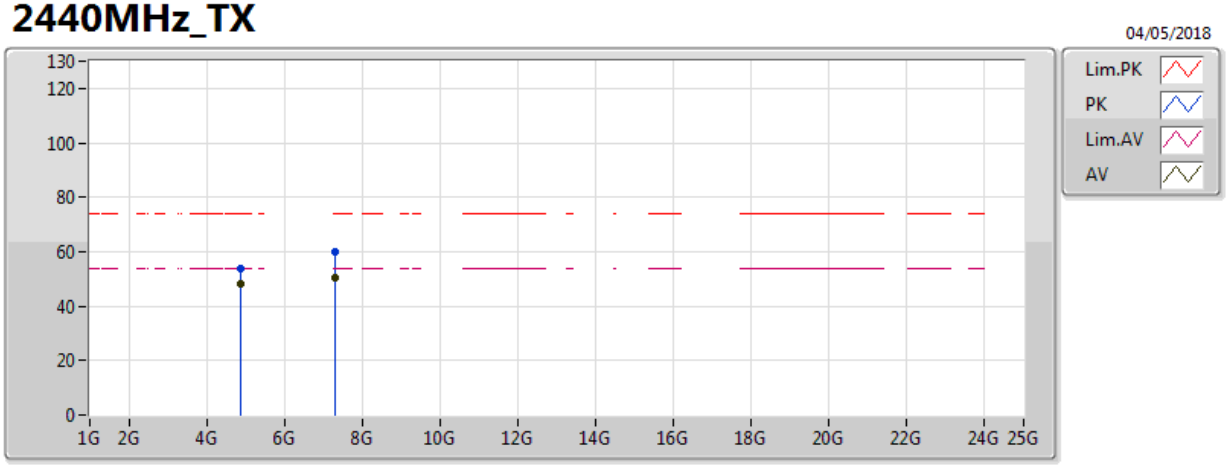
2440MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.3868G	43.40	54.00	-10.60	30.37	3	Horizontal	10	2.13	-	13.03	27.13	3.24	-
AV	2.44G	105.58	Inf	-Inf	30.55	3	Horizontal	10	2.13	-	75.03	27.26	3.29	-
AV	2.488G	44.62	54.00	-9.38	30.71	3	Horizontal	10	2.13	-	13.91	27.37	3.34	-
PK	2.348G	53.82	74.00	-20.18	30.24	3	Horizontal	10	2.13	-	23.58	27.04	3.20	-
PK	2.4404G	106.94	Inf	-Inf	30.55	3	Horizontal	10	2.13	-	76.39	27.26	3.29	-
PK	2.4916G	55.37	74.00	-18.63	30.72	3	Horizontal	10	2.13	-	24.65	27.38	3.34	-

BT-LE(1Mbps)

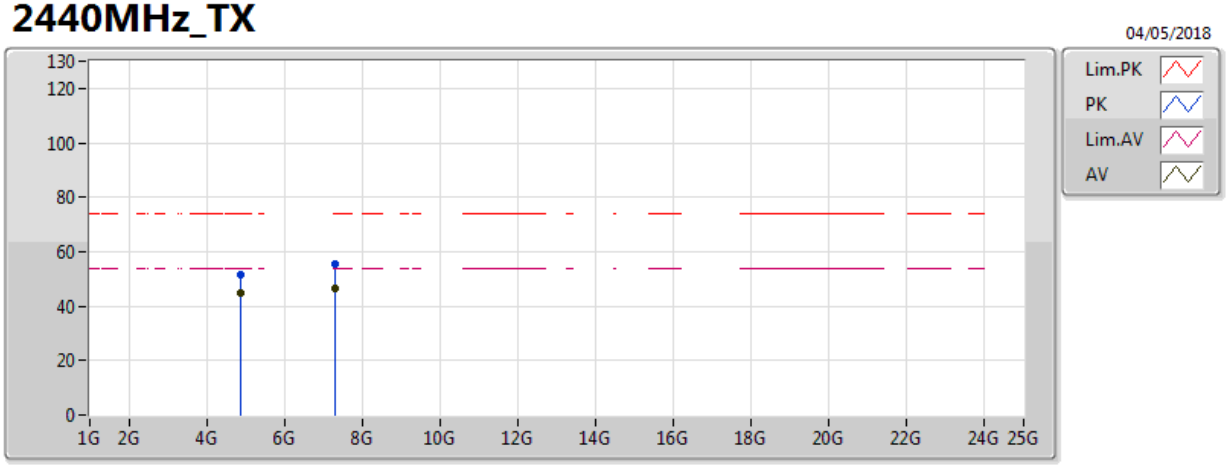
2440MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.88008G	48.41	54.00	-5.59	5.95	3	Vertical	257	1.16	-	42.46	31.23	4.55	29.83
AV	7.31942G	50.46	54.00	-3.54	11.14	3	Vertical	173	1.18	-	39.32	35.83	6.12	30.80
PK	4.87958G	53.87	74.00	-20.13	5.95	3	Vertical	257	1.16	-	47.92	31.23	4.55	29.83
PK	7.32084G	59.81	74.00	-14.19	11.15	3	Vertical	173	1.18	-	48.66	35.83	6.12	30.80

BT-LE(1Mbps)

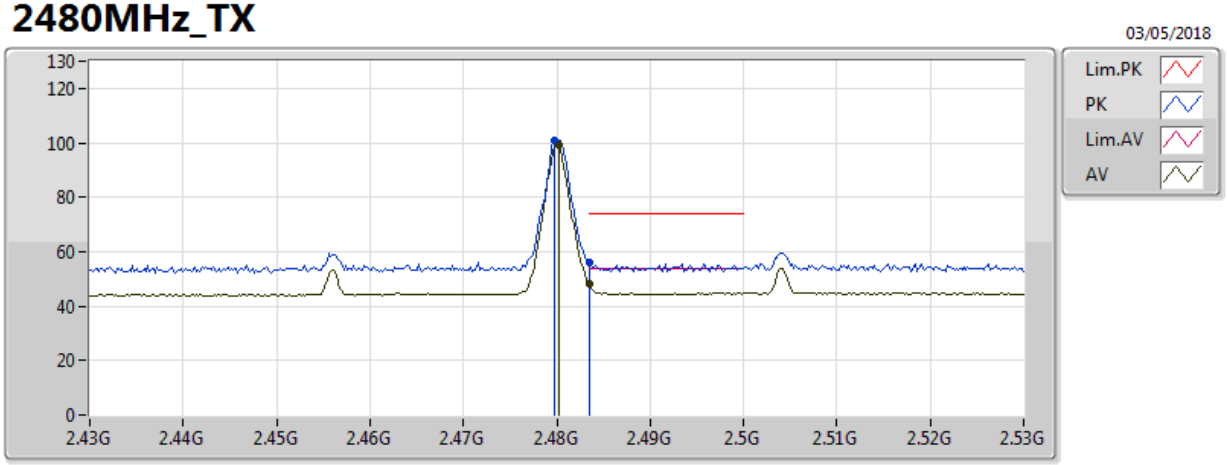
2440MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.8801G	44.72	54.00	-9.28	5.95	3	Horizontal	28	1.12	-	38.77	31.23	4.55	29.83
AV	7.31942G	46.26	54.00	-7.74	11.14	3	Horizontal	28	1.17	-	35.12	35.83	6.12	30.80
PK	4.8795G	51.37	74.00	-22.63	5.95	3	Horizontal	28	1.12	-	45.42	31.23	4.55	29.83
PK	7.32092G	55.49	74.00	-18.51	11.15	3	Horizontal	28	1.17	-	44.34	35.83	6.12	30.80

BT-LE(1Mbps)

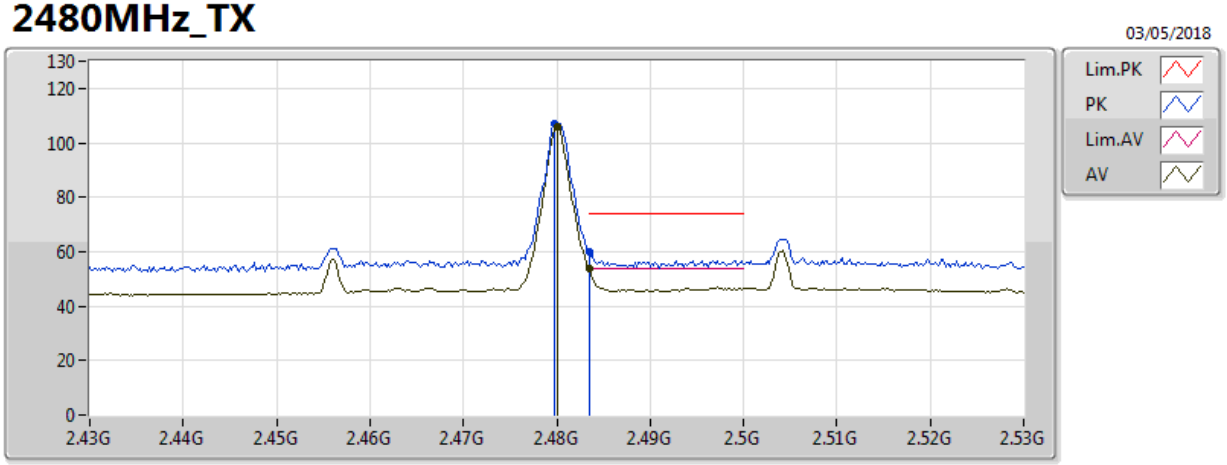
2480MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.4802G	99.33	Inf	-Inf	30.68	3	Vertical	170	1.49	-	68.65	27.35	3.33	-
AV	2.483502G	48.45	54.00	-5.55	30.69	3	Vertical	170	1.49	-	17.76	27.36	3.33	-
PK	2.4798G	100.65	Inf	-Inf	30.68	3	Vertical	170	1.49	-	69.97	27.35	3.33	-
PK	2.483502G	55.86	74.00	-18.14	30.69	3	Vertical	170	1.49	-	25.17	27.36	3.33	-

BT-LE(1Mbps)

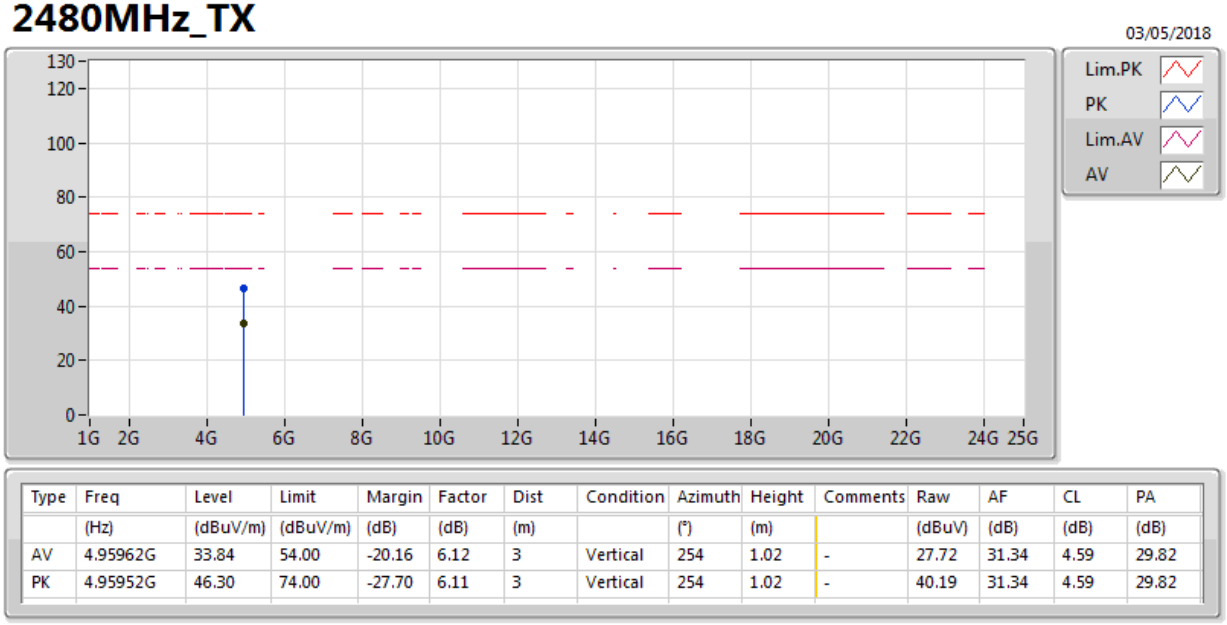
2480MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	2.48G	105.89	Inf	-Inf	30.68	3	Horizontal	9	2.69	-	75.21	27.35	3.33	-
AV	2.483502G	53.83	54.00	-0.17	30.69	3	Horizontal	9	2.69	-	23.14	27.36	3.33	-
PK	2.4798G	107.16	Inf	-Inf	30.68	3	Horizontal	9	2.69	-	76.48	27.35	3.33	-
PK	2.483502G	59.97	74.00	-14.03	30.69	3	Horizontal	9	2.69	-	29.28	27.36	3.33	-

BT-LE(1Mbps)

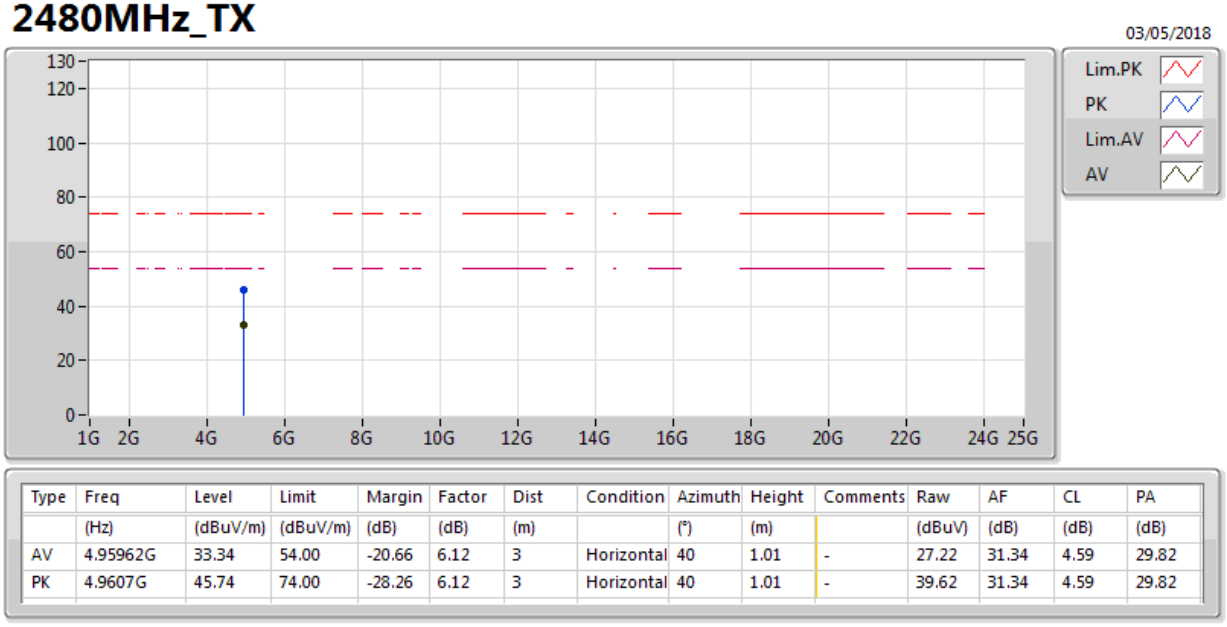
2480MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.95962G	33.84	54.00	-20.16	6.12	3	Vertical	254	1.02	-	27.72	31.34	4.59	29.82
PK	4.95952G	46.30	74.00	-27.70	6.11	3	Vertical	254	1.02	-	40.19	31.34	4.59	29.82

BT-LE(1Mbps)

2480MHz_TX



Type	Freq	Level	Limit	Margin	Factor	Dist	Condition	Azimuth	Height	Comments	Raw	AF	CL	PA
	(Hz)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	(m)		(°)	(m)		(dBuV)	(dB)	(dB)	(dB)
AV	4.95962G	33.34	54.00	-20.66	6.12	3	Horizontal	40	1.01	-	27.22	31.34	4.59	29.82
PK	4.9607G	45.74	74.00	-28.26	6.12	3	Horizontal	40	1.01	-	39.62	31.34	4.59	29.82